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Weekly Surveyor

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tempt to develop a radio sonobuoy whose manufacture is sufficiently simple and inexpensive to allow it to be used in an expendable fashion. The US has used expendable sonobuoys since the late 1950s.

The Institute of High Temperatures now dominates all open-cycle MHD research and development in the USSR, including both clean-fuel and now coal-fired studies. It is now the only institute with which the US will participate in implementing the agreements of the US-USSR MHD exchange.

WEEKLY SURVEYOR

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USSR AND EASTERN EUROPE

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The Soviets have reclaimed 280,000 hectares of saline soils in Uzbekistan, Uzbek, SSR. The project was started in 1962 and reclamation of 1 million hectares is planned. Considering the time involved in reclaiming 280,000 hectares, many years will pass before the plan is completed.

A new low-frequency radio sonobuoy described by the Soviets represents an at-

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AGROTECHNOLOGY AND FOOD RESOURCES

Soviets Reclaim Saline Soils in Uzbekistan: As the result of a reclamation project in Uzbekistan, (Uzbek SSR), begun in 1962, some 280,000 hectares of rich loess soils have been reclaimed. Eighty-five percent of the land is irrigated and planted to cotton and 15% is planted to wheat and tobacco. The Soviet long-term plan is to reclaim one million hectares. The soils which are often 70 to 90 meters deep may contain up to 40 grams/liter of salts. Water from the southern mountains is utilized to flush out the salts through drainage tiles 35-38 cm deep and 4 km apart. Lateral tiles lead to 9.2 m deep drainage ditches, 6 to 10 km apart which carry the water to an old lake bed, 60 km southwest of Tashkent. The resulting lake reportedly is 2.5 to 3 m deep and stocked with salt-water fish. Reclamation takes 4 years. The first year the land is constantly flooded with 46 cm of water; it is planted the second year, followed by flooding the third year and then it is replanted.

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Comment: This project demonstrates a growing Soviet emphasis on land reclamation and irrigation. One of the reasons for this emphasis is the lack of alternative opportunities for major expansion of arable land. The loess soils are highly fertile and their productivity should be high under irrigation. Leaching salts through flooding and drainage is the major technique employed world-wide for reclaiming saline soils and the Soviets have considerable experience with this procedure. To be successful, the drainage system will have to be maintained to prevent further salinization during long-term irrigation.

No time period was given for the plan for reclaiming 1 million hectares, but considering the time involved in reclaiming 280,000 hectares, it is many years away. Such a plan has been estimated to cost as much as \$5 billion. A major problem will be the securing of an adequate water supply for the flushing process without interfering with water requirements for irrigation. Soviet efforts to expand arable land in this area and in the non-black soil region illustrate the time and cost factors involved in the development of new arable land.

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PHYSICAL SCIENCES AND TECHNOLOGIES

Soviets Describe Linear Towed Hydroacoustic Arrays for the First Time: Soviet scientists at the Institute of Oceanology, USSR Academy of Sciences, recently published two papers on linear, towed arrays--one 44 meters long operating at frequencies in the subkilohertz region and the other 5 meters long operating around a few kilohertz. The arrays are reported to be effective at towing speeds from 12 to 18 knots. Reportedly, the low-frequency array is for marine seismic measurements and the high-frequency one is for bathymetric studies.

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Comment: While the Soviets are known to have employed towed arrays for scientific purposes for some time, this is the first full description available on them. In addition to these arrays, the Soviets are also known to have longer towed arrays for offshore petroleum prospecting on geophysical ships such as the Vladimir Obruchev and the Yuriy Godin. Reportedly, the total length of the longer array cables are 3.9 and 2 km, respectively, but it is not known what portions of these lengths contain sensors.

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Soviet Marine Geologists Describe a Modified Seismic Sonobuoy:
Marine geologists G. B. Udintsev, G. N. Lunarskiy, and A. F. Beresnev of the Institute of Oceanology, USSR Academy of Sciences (IOAN), recently described a modification of IOAN's standard low-frequency radio sonobuoy. To reduce the cost and eventually achieve an expendable model, the standard sonobuoy was reduced in size and its structural elements and electronic circuits modified. The new buoy is designed to receive sound waves emitted by a pneumatic radiator (air gun) towed behind a research vessel. Subbottom reflections of these sound waves are received by the sonobuoy in the acoustic frequency range 5 to 200 Hz, converted to a radio signal centered at 42 MHz, and transmitted to the research vessel.

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Comment: The new buoy clearly represents an attempt by the Soviets to develop a radio sonobuoy whose manufacture is sufficiently simple and inexpensive to allow it to be used in an expendable fashion, a goal the Soviets apparently have not yet achieved for research sonobuoys. The US, in contrast, has used expendable research sonobuoys since the late 1950s.

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Although it is not clear from the Soviet report, the modified buoy very likely uses solid-state devices. On balance, though, the USSR must still be judged far behind the US in the design and production of expendable radio sonobuoys for research purposes.

The military significance of the modified buoy is considered negligible in view of the fact that it was developed at IOAN and reported in the open literature.

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The Institute of High Temperatures, USSR, Broadens Role to Include Coal-Fired MHD: The Institute of High Temperatures (IVT) has received the authority, formerly held by the Krzhizhanovskiy Power Engineering Institute (ENIN), to conduct all coal-burning MHD studies in the Soviet Union. Personnel in charge of the coal combustion studies at ENIN have been transferred to IVT and report to A. Ye. Sheyndlin, Director, IVT. [REDACTED]

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Comment: IVT's broader role in developing open-cycle MHD is not unexpected. Originally, IVT chose the option of developing open-cycle MHD fueled by natural gas, and ENIN studied coal-fired MHD. Because recent US studies, which were available to the Soviets, indicate that coal promises to be a better fuel for open-cycle MHD than natural gas and the present growing importance of natural gas as an export commodity in the Soviet Union, Sheyndlin may have realized that if IVT was to remain the dominant MHD organization in the USSR, he would have to pursue coal. By using his political influence and arguing IVT's superior technical capability, he probably was able to wrest away successfully the coal charter from ENIN.

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